

## CLAIMS

1. A sliding door device for an air-conditioning system comprising:  
a sliding door that moves so as to intersect an air flow path and is used to control the flow rate or direction of the air within said air flow path ;  
wherein the two ends of said sliding door each constitute a sliding unit inserted at and moves within a guide groove at an air-conditioner case; and  
wherein said sliding unit includes a tension applying means for applying tension between said sliding unit and said guide groove.
2. A sliding door device for an air-conditioning system comprising:  
a sliding door disposed so as to intersect an air flow path on the upstream side of a heating heat exchanger to adjust the ratio of the quantity of air to pass through said heating heat exchanger and the quantity of air to bypass said heating heat exchanger;  
wherein the two ends of said sliding door each constitute a sliding unit inserted at and moves within a guide groove at an air-conditioner case; and  
wherein said sliding unit includes a tension applying means for applying tension between said sliding unit and said guide groove.
3. A sliding door device for an air-conditioning system according to

claim 1 or claim 2, wherein:

said tension applying means is constituted with a point contact projection disposed at the center thereof and a linear non-contact projection disposed around said point contact projection with a gap formed therebetween.

4. A sliding door device for an air-conditioning system according to claim 3, wherein:

said gap is set equal to or less than 1mm.

5. A sliding door device for an air-conditioning system according to claim 3, wherein:

said point contact projection is supported at a tension bridge formed over an area surrounded by the non-contact projection.

6. A sliding door device for an air-conditioning system according to any of claims 1, 2 and 3, wherein:

said sliding unit assumes a notched shape achieved by alternating projected portions and indented portions.

7. A sliding door device for an air-conditioning system according to claim 1,

wherein said sliding door is disposed so as to intersect said air flow path upstream of a heating heat exchanger to adjust the ratio of the

quantity of air to pass through said heating heat exchanger and the quantity of air to bypass said heating heat exchanger; and

wherein a longitudinal rib is formed so as to continuously extend linearly along the direction in which said sliding door slides.

8. A sliding door device for an air-conditioning system according to claim 7, wherein:

a lateral rib extending linearly along the direction perpendicular to the sliding direction is formed at said sliding door.

9. A sliding door device for an air-conditioning system according to claim 8, wherein:

said lateral rib is constituted with a single protruding flat surface portion.

10. A sliding door device for an air-conditioning system according to claim 8, wherein:

said lateral rib is constituted as a plurality of indented flat surface portions.

11. A sliding door device for an air-conditioning system according to claim 10, wherein:

the lateral rib may be constituted of a plurality of indented flat surface portions disposed with an offset so as to not overlap on each of

the two sides of said longitudinal rib.

12. A sliding door device for an air-conditioning system according to claim 7, wherein:

said sliding door includes a protruding flat surface portion and an indented flat surface portion formed alternately along the longitudinal direction.

13. A sliding door device for an air-conditioning system according to claim 7, wherein:

no diagonal rib is formed at said sliding door.

14. A sliding door device for an air-conditioning system according to claim 1, further comprising:

a shaft rotatably disposed at a position in close proximity to said sliding door, which is used to cause said sliding door to move,

wherein a pair of male engaging portions project out from the circumferential surface of said shaft, a pair of female engaging portions that are allowed to engage with said pair of male engaging portions are formed at a surface of said sliding door at which a pair of racks are formed and said male engaging portions and said female engaging portions adopt an engaging structure that only allows said male engaging portions and said female engaging portions to engage each other in a correct engagement.

15. A sliding door device for an air-conditioning system according to claim 1,:

wherein said sliding door is disposed so as to intersect said air flow path upstream of a heating heat exchanger to adjust the ratio of the quantity of air to pass through said heating heat exchanger and the quantity of air to bypass said heating heat exchanger;

wherein said sliding door device further includes;

a shaft rotatably disposed at a position in close proximity to said sliding door, which is used to cause said sliding door to move; and

wherein a pair of male engaging portions project out from the circumferential surface of said shaft, a pair of female engaging portions that are allowed to engage with said pair of male engaging portions are formed at a surface of said sliding door at which a pair of racks are formed and said male engaging portions and said female engaging portions adopt an engaging structure that only allows said male engaging portions and said female engaging portions to engage each other with a correct engagement.

16. A sliding door device for an air-conditioning system according to claim 14 or claim 15, wherein:

said pair of male engaging portions are formed in different sizes and said pair of female engaging portions are formed in different sizes in correspondence to the sizes of said pair of male engaging portions.

17. A sliding door device for an air-conditioning system according to any of claims 14, 15 and 16, wherein:

the widths of said pair of male engaging portions are set differently from each other and, in correspondence, the widths of said pair of female engaging portions are set different from each other.

18. A sliding door device for an air-conditioning system according to claim 1, further comprising:

a seal member disposed at an end of said sliding door, which becomes pressed against said contact portion formed at the member constituting said air flow path at the sliding end position along the direction in which said sliding door moves,

wherein said seal member, projecting out from said sliding door along the moving direction, achieves a ratio of a longitudinal dimension to a lateral dimension thereof within a range of 1 or more and 2 or less.

19. A sliding door device for an air-conditioning system according to claim 1,

wherein said sliding door is disposed so as to intersect said air flow path upstream of a heating heat exchanger to adjust the ratio of the quantity of air to pass through said heating heat exchanger and the quantity of air to bypass said heating heat exchanger;

wherein said sliding door includes a seal member disposed at an end

of said sliding door, which becomes pressed against a contact portion formed at a member constituting said air flow path at a sliding end position along a direction in which said sliding door moves; and

wherein said seal member projecting out from said sliding door along the moving direction, achieves a ratio of a longitudinal dimension to a lateral dimension thereof within a range of 1 or more and 1 or less.

20. A sliding door device for an air-conditioning system according to claim 19, wherein:

the lateral dimension of said seal member is set equal to or greater than 5 mm.

21. A sliding door device for an air-conditioning system, comprising:

an air-conditioner case having an air flow path formed therein;

a sliding door mounted at guide grooves formed at said air-conditioner case on the two sides thereof constituting side surfaces of said air flow path, at a position upstream of a heating heat exchanger; and

a shaft rotatably bridging said air-conditioner case constituting said side surfaces of said air flow path at a position in close proximity to said sliding door,;

wherein racks formed on the upstream side of said sliding door each interlock with a pinion formed at each end of said shaft so as to allow said sliding door to slide through said guide grooves; and

wherein said racks as said sliding door and said pinions formed at said shaft are covered with cover members extending from the circumferential edges of said guide grooves.

22. A sliding door device for an air-conditioning system according to claim 21, wherein:

said cover members are formed at integrated parts of said air-conditioner case, and said cover member extends from the circumferential edges of said guide grooves along walls constituting side surfaces of said air flow path at said air-conditioner case.

23. A sliding door device for an air-conditioning system, comprising:

a sliding door disposed so as to intersect an air flow path at a position upstream of a heating heat exchanger to be used to adjust the ratio of the quantity of air to pass through said heating heat exchanger and the quantity of air to bypass said heating heat exchanger;

wherein said sliding door is made to move along the vertical direction in which the deadweight thereof is applied, an extensible cable is used as a means for adjusting the openness of said sliding door, and said cable is operated along a pulling direction when said sliding door needs to move against gravity.

24. A sliding door device for an air-conditioning system, comprising:

a sliding door disposed so as to intersect an air flow path at a



position upstream of said heating heat exchanger to be used to adjust the ratio of the quantity of air to pass through said heating heat exchanger and the quantity of air to bypass said heating heat exchanger,

wherein said sliding door is made to move along the vertical direction in which the deadweight thereof is applied, an extensible cable is used as a means for adjusting the openness of said sliding door, and said sliding door is set so that said cable is extended to the greatest extent when said sliding door moves to the uppermost position and so that the deadweight is added onto the drive force imparted by said cable as said sliding door descends.

25. A sliding door device for an air-conditioning system according to claim 23 or claim 24, wherein:

when the forced air is fed to a heater core in an entirety thereof when said sliding door has moved to the uppermost position.

26. A sliding door device for an air-conditioning system according to claim 23 or claim 24, wherein:

the forced air is fed to a heater core in an entirety thereof when said cable is in a most extended state.

27. A sliding door device for an air-conditioning system, comprising:

a shaft rotatably bridging side surfaces of an air flow passage, at which axially supported portions each formed at one of the two ends of

said shaft and axially supported at a side wall defining said air flow passage, pinions disposed inward relative to said axially supported portions and a bridge portion disposed between said pinions are formed with a ventilating passage formed so as to pass through said bridge portion; and

a door main unit used to adjust the ratio of the quantity of air to pass through a heating heat exchanger and the quantity of air to bypass said heating heat exchanger, with racks formed at a surface thereof ranging so as to intersect the direction of air flow,;

wherein said pinions as said shaft are made to interlock with said racks at said door main unit to allow said door main unit to slide along the direction intersecting the direction of the air flow; and

wherein said shaft and said door main unit are assembled together so as to set said air flow passage at said shaft and the surface of said door main unit at which said racks are formed substantially parallel to each other when said door main unit reaches a sliding end position against said shaft.

28. A sliding door device for an air-conditioning system, comprising:

an air-conditioner case with an air flow path formed therein;

a sliding door that is guided along a guide unit formed at said air-conditioner case to slide along a direction intersecting said air flow path; and

a seal member disposed at said sliding door, which is pressed along

the sliding direction against a contact portion formed at said air-conditioner case at a stop position of said sliding door,

wherein said seal member is disposed so as to be allowed to move while forming a gap between said seal member and said air-conditioner case and a pressure-responsive deformation portion that becomes deformed along a direction different from the sliding direction upon pressure contact with said contact portion to come into close contact with said air-conditioner case is formed at said seal member.

29. A sliding door device for an air-conditioning system according to claim 28, wherein:

said pressure-responsive deformation portion is constituted with a deformable bump that projects out at an end of said sealing member along the sliding direction and becomes elastically deformed along a direction intersecting the sliding direction upon pressure contact with said contact portion.

30. A sliding door device for an air-conditioning system according to claim 29, wherein:

as said deformable bump is pressed against said contact portion, said deformable bump comes in contact with said guide unit.

31. A sliding door device for an air-conditioning system according to claim 29 or claim 30, wherein:

a wall portion to face opposite the surface of said sliding door where said seal member is disposed is formed at said air-conditioner case and said deformable bump comes in contact with said wall portion as said deformable bump is pressed against said contact portion.

32. A sliding door device for an air-conditioning system according to claim 28, wherein:

said wall portion ranges along said contact portion at said air-conditioner case.

33. A sliding door device for an air-conditioning system according to claim 32, wherein:

said wall portion is constituted as a rib raised upright along the sliding direction and ranging along said contact portion, with said seal member disposed at an end of said sliding door along the sliding direction.

34. A sliding door device for an air-conditioning system according to claim 33, wherein:

said wall portion is disposed on each of two sides of said contact portion, with the distance between wall surfaces facing opposite each other gradually becoming smaller as said wall surfaces range further away from the opening end at which said pressure-responsive deformation portion is inserted.